

SILICA-COATED NANODIAMONDS FOR IMAGING AND DELIVERY OF THERAPEUTIC AGENTS

SUMMARY

The NCI Radiation Oncology Branch and the NHLBI Laboratory of Single Molecule Biophysics seek parties to co-develop fluorescent nanodiamonds for use as *in vivo* and *in vitro* optical tracking probes toward commercialization.

REFERENCE NUMBER

E-175-2012

PRODUCT TYPE

- Diagnostics
- Research Materials
- Therapeutics

KEYWORDS

- Diagnostic
- imaging
- nanodiamond
- silica-coated
- functionalized

COLLABORATION OPPORTUNITY

This invention is available for licensing.

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DESCRIPTION OF TECHNOLOGY

The [NCI Radiation Oncology Branch](#) and the [NHLBI Laboratory of Single Molecule Biophysics](#) seek parties to co-develop fluorescent nanodiamonds for use as *in vivo* and *in vitro* optical tracking probes toward commercialization.

NCI and NHLBI investigators invented a robust and easily implemented method of synthesizing silica-coated nanodiamonds for imaging and therapeutic applications. A patent estate covering these methods

is offered for licensing to commercial entities. The method generally includes coating nanodiamonds with a silica precursor, e.g, tetraethylorthosilicate (TEOS), inside liposomes. The liposomes are then removed to yield a final product that is stable, monodisperse, and easy to functionalize.

US Provisional Application No. 61/711,702 filed 09 Oct 2012 - See more at:

https://ttc.nci.nih.gov/opportunities/opportunity.php?opp_id=18434745489...

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POTENTIAL COMMERCIAL APPLICATIONS

- Imaging
- Drug delivery

COMPETITIVE ADVANTAGES

- Small size
- Physiologically inert carrier
- Monodisperse
- Stable in aqueous solution
- Readily functionalized
- Biological activity is determined more efficiently than chemical analysis
- High Specificity and selectivity

INVENTOR(S)

Martin W Brechbiel (NCI) and Keir C Neuman (NHLBI)

DEVELOPMENT STAGE

- Prototype

PUBLICATIONS

1. Yu SJ, et al. Bright fluorescent nanodiamonds: no photobleaching and low cytotoxicity. J Am Chem Soc. 2005 Dec 21;127(50):17604-5. [PMID 16351080]
2. Wilson RM. Nanodiamonds are promising quantum probes of living cells. Phys Today 2011 Aug;64(8):17. [doi 10.1063/PT.3.1204]
3. Chow EK, et al. Nanodiamond therapeutic delivery agents mediate enhanced chemoresistant tumor treatment. Sci Transl Med. 2011 Mar 9;3(73):73ra21. [PMID 21389265]
4. Krueger A. New carbon materials: biological applications of functionalized nanodiamond materials. Chemistry 2008;14(5):1382-90. [PMID 18033700]

PATENT STATUS

- **U.S. Filed:** US Provisional Application No. 61/672,996 filed 18 Jul 2012
- **U.S. Provisional:** US Provisional Application No. 61/711,702 filed 09 Oct 2012

THERAPEUTIC AREA

- Cancer/Neoplasm